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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,764	08/31/2001	Satoru Hosono	Q66059	9203

7590

12/18/2002

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EXAMINER

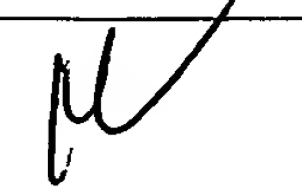
MOUTTET, BLAISE L

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/942,764		HOSONO ET AL. 	
	Examiner		Art Unit	
	Blaise L Mouttet		2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 8-37 is/are rejected.
- 7) ☒ Claim(s) 2-7,38 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 1-37 are objected to for the following informalities:

In claim 1, lines 9 and 10 "the measured natural period" should read --the identified natural period-- in accordance with the antecedent basis contained in claim 1.

In claim 8, lines 2-3 "the measured natural period" should read --the identified natural period-- in accordance with the antecedent basis contained in claim 1.

In claim 30, line 2 "the measured natural period" should read --the identified natural period-- in accordance with the antecedent basis contained in claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. Applicant's amendments entered October 28, 2002 have overcome the 35 USC 112 rejection contained in the prior office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 35 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Teramae et al. EP 1 023 997.

Teramae et al. discloses an ink jet recording head including a plurality of nozzle orifices (50) forming at least one nozzle row, pressure chambers (51) each generating pressure fluctuation in ink provided with the associated nozzle orifice and piezoelectric pressure generating elements each generating pressure fluctuation in ink provided in the associated pressure chamber to eject an ink drop from the associated nozzle orifice (column 8, lines 18-41).

The examiner notes that claims 35 and 36 are product by process claims and are not limited to the manipulation of the recited steps only the structure implied by the steps (see MPEP 2113).

4. Claims 35 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagoshi et al. US 6,224,182.

Nagoshi et al. discloses an ink jet recording head including a plurality of nozzle orifices (1A) forming at least one nozzle row, pressure chambers (the ink chambers as shown in figure 9) each generating pressure fluctuation in ink provided with the associated nozzle orifice and heater pressure generating elements (1B) each generating pressure fluctuation in ink provided in the associated pressure chamber to

eject an ink drop from the associated nozzle orifice (column 7, line 57 - column 8, line 2).

The examiner notes that claims 35 and 37 are product by process claims and are not limited to the manipulation of the recited steps only the structure implied by the steps (see MPEP 2113).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 8, 13, 14, 17 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoshi et al. US 6,224,182 in view of Bartky et al. US 4,973,981.

Nagoshi et al. discloses, regarding claim 1, a method of manufacturing an ink jet recording head which includes a plurality of nozzle orifices (1A) forming at least one nozzle row, pressure chambers (the ink chambers as shown in figure 9) each generating pressure fluctuation in ink provided with the associated nozzle orifice and pressure generating elements (1B) each generating pressure fluctuation in ink provided in the associated pressure chamber to eject an ink drop from the associated nozzle orifice (column 7, line 57 - column 8, line 2), the method comprising the steps of:

assembling the ink jet recording head (1) (as inherent from column 7, lines 57-67);

identifying characteristics of the recording head based on measurements of the assembled recording head (S610, S640, S670) as described with reference to figure 1;

classifying the assembled recording head into a plurality of ranks based on the identifying characteristics (S630, S660, S690) as described with reference to figure 1 and in the abstract.

Regarding claim 13, a memory (40F) is provided to store the classified rank (column 17, lines 30-34).

Regarding claim 14, a drive signal is provided having a wave element with a control factor defined in accordance with the classified rank which is supplied to the pressure generating element (column 17, lines 37-44).

Regarding claim 17, the ink jet recording head is denoted by (1) in figure 8 and the waveform controller is inherent to apply the drive voltage as explained in column 17, lines 37-44.

Nagoshi et al. fails to disclose, regarding claims 1, 8 and 30, that the identifying step is a step of identifying a natural period of ink pressure fluctuation based on a plurality of measurements and that the plurality of ranks are indicated relative to a designed criteria of the identified natural period.

Bartky et al. discloses classifying pressure generating elements utilized in an ink jet recording head based on an identification of a natural period of ink pressure fluctuation obtained from a plurality of measurements (abstract, column 3, lines 9-25) and that a plurality of ranks are indicated relative to a designed criteria (optimum results) of the identified natural period (column 3, lines 37-46).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to identify the natural period of ink pressure of pressure generating ink ejection elements as taught by Bartky et al. in the identification step of Nagoshi et al. and classify the recording head into the rank based on the natural period as taught by Bartky et al.

The motivation for doing would have been to allow for the recognition of the existing state of the recording head as taught by column 4, lines 40-48 of Nagoshi et al. with a testing method which is both nondestructive and which can be performed rapidly as taught by column 2, lines 12-15 of Bartky et al.

6. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoshi et al. US 6,224,182 in view of Bartky et al. US 4,973,981, as applied to claim 1, and further in view of Arthur et al. US 5,049,898.

Nagoshi et al. in view of Bartky et al. fail to disclose that the ranks for the respective nozzle groups are indicated as a symbol or coded as information on the recording head readable by an optical reader.

Arthur et al. teaches utilizing optical bar coding to indicate characteristic information of a recording head (column 6, lines 32-40).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to store the rank on the recording head as a coded symbol to be read by an optical scanner as taught by Arthur et al. in the method of Nagoshi et al. in view of Bartky et al.

The motivation for doing so would have been to easily identify the operational characteristics of the print head as suggested by column 6, lines 32-40 of Arthur et al.

7. Claims 15, 16, 18-29, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoshi et al. US 6,224,182 in view of Bartky et al. US 4,973,981, as applied to claims 14 and 17, and further in view of Teramae et al. EP 1 023 997.

Regarding claim 31, Nagoshi et al. discloses that a memory (40F) electrically stores the head rank (column 17, lines 30-34).

Regarding claim 33, Barkly et al. discloses that the pressure generating element is a piezoelectric element (column 2, lines 49-52).

Nagoshi et al. in view of Bartky et al. fail to disclose that the drive signal for the pressure generating element includes the ejection element, the damping element, characteristics changing element, control factor and various waveform elements as specified.

Teramae et al. discloses, regarding claims 15, 16 and 18, as shown in figure 8 a drive signal for a piezoelectric ink ejecting pressure generating element that is provided with an ejection element (18) for ejecting ink, a damping element (20) which follows the ejection element to damp vibration of a meniscus and the time period of the damping element is altered to change ejection characteristics (column 16, lines 6-13).

Teramae et al. discloses, regarding claims 19, the drive signal (figure 8) includes an expansion element (16), ejection element (18), a holding element (17) and a

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damping element (20) wherein the waveform controller defines the duration of the holding element (column 12, lines 20-53).

Teramae et al. discloses, regarding claim 20, the drive signal includes an expansion element (16), ejection element (18) and a damping element (20) wherein the waveform controller defines the duration of the damping element (column 12, lines 20-53).

Teramae et al. discloses, regarding claim 21 and 22, the drive signal includes an ejection element (18), a damping element (20) and a connecting element (19) wherein the waveform controller defines the duration of the connecting element (column 12, lines 20-53).

Teramae et al. discloses, regarding claim 23, that characteristics of the waveform elements that eject ink drops are changed (column 13, line 52 - column 14, line 2).

Teramae et al. discloses, regarding claims 24, 25 and 28, the drive signal includes an expansion element (16) and ejection element (18) wherein the waveform controller defines the duration of the expansion and ejection elements and a duration (column 12, lines 20-53) and a potential difference (VHN) between an initial end and a termination end of the expansion element and ejection element (column 13, line 52 - column 14, line 2).

Teramae et al. discloses, regarding claims 26, 27 and 29, the drive signal includes an expansion element (16), holding element (17) and ejection element (18) wherein the duration of the elements is defined by the waveform controller (column 12, lines 20-53).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the drive signal disclosed by Teramae et al. as the drive signal of Nagoshi et al. in view of Bartky et al.

The motivation for doing so would have been in order to choose a drive signal which can compensate for variations in actuator unit as taught by column 1, lines 37-41 of Teramae et al.

8. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoshi et al. US 6,224,182 in view of Bartky et al. US 4,973,981 and Teramae et al. EP 1 023 997, as applied to claim 23, and further in view of Arthur et al. US 5,049,898.

Nagoshi et al. in view of Bartky et al. and Teramae et al. fail to disclose an optically readable rank indicator associated with the classified rank or an optical reader which reads the rank.

Arthur et al. teaches utilizing optical bar coding to indicate characteristic information of a recording head (column 6, lines 32-40).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to store the rank on the recording head as a coded symbol to be read by an optical scanner as taught by Arthur et al. in the method of Nagoshi et al. in view of Bartky et al. and Teramae et al.

The motivation for doing so would have been to easily identify the operational characteristics of the print head as suggested by column 6, lines 32-40 of Arthur et al.

9. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoshi et al. US 6,224,182 in view of Bartky et al. US 4,973,981 and Teramae et al. EP 1 023 997, as applied to claim 23, and further in view of Chang et al. US 5,541,628.

Nagoshi et al. in view of Bartky et al. and Teramae et al. fail to disclose that the piezoelectric pressure generating element is a heating element.

Chang et al. discloses piezoelectric pressure generating elements used to generate heat to compensate for environmental effects on an ink jet recording head (column 2, lines 26-28).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the piezoelectric pressure generating elements taught by Nagoshi et al. in view of Bartky et al. and Teramae et al. to generate heat as taught by Chang et al.

The motivation for doing so would have been in order to compensate for environmental conditions as suggested by column 2, lines 26-28 of Chang et al.

Allowable Subject Matter

10. Claims 2-7, 38 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the indication of the allowability of claims 2, 3, 6 and 7 is the inclusion therein, in combination as currently claimed, of the step of identifying the natural period based on a correlation between the time period and the measured ink amount. This limitation is found in claims 2, 3, 6 and 7 and is neither disclosed nor taught by the prior art of record, alone or in combination.

The primary reason for the indication of the allowability of claims 4, 5, 38 and 39 is the inclusion therein, in combination as currently claimed, of the step of identifying the natural period based on a correlation between the time period and the measured ejection speed. This limitation is found in claims 4, 5, 38 and 39 and is neither disclosed nor taught by the prior art of record, alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

11. Applicant's arguments filed October 28, 2002 have been fully considered in light of the amendments to the claims. As amended claims 1 and 8-37 have overcome the prior rejection however have necessitated new rejections. Claims 2-7, 38 and 39 are deemed allowable if written in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet whose telephone number is (703) 305-3007. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow, Jr. Art Unit 2853, can be reached on (703) 308-3126. The

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fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet December 4, 2002

Bm 12/4/2002



ANHT.N. VO
PRIMARY EXAMINER

12/12/02